

# Energy Management in Arlington County, Virginia: An essential part of our CO2 reduction efforts

John Morrill, CEM  
Energy Manager  
Arlington County OSS  
1400 N. Uhle St. #403  
Arlington, VA 22201  
jmorri2@co.arlington.va.us  
703-228-4426

# SUMMARY

- Very large energy and \$ savings can be found in many buildings. Much of these savings can be gained at low cost (O&M!), thereby demonstrating results that attract additional \$ for investment.
- Significant (10-30%) reductions in CO<sub>2</sub> are reasonable targets for local governments over a 10-year horizon, achievable through increased efficiency & use of alternate fuel.

# ARLINGTON COUNTY, VIRGINIA

- Geographically, smallest County in USA (26 square miles), located across the Potomac River from Washington DC
- Urban (190,000 residents), with population density similar to Seattle, Pittsburgh
- Affluent, progressive community with many active *green* initiatives

# ARLINGTON COUNTY, VIRGINIA

- 1970s, 1980s: Adopted award-winning transit-oriented development plan, concentrating urban growth along METRO corridors while preserving neighborhoods (“smart growth” before it was a buzzword)
- 1980s-present: Established award-winning commuter assistance program, expanding its services frequently to meet demand and assist local/regional clean air goals

# ARLINGTON COUNTY, VIRGINIA

- 1990s: Joined EPA's Green Lights/Energy Star<sup>®</sup> programs
- 2000: First-of-kind bonus density incentive program for private development achieving LEED<sup>™</sup> silver certification
  - County has adopted LEED as a goal for public buildings, with 7 buildings under construction or in design to meet LEED certification
- 2000: Energy manager hired

# ARLINGTON COUNTY, VIRGINIA

- 2001: Joined ICLEI's Cities for Climate Protection campaign
- 2002: Began using B20 biodiesel; took delivery of 15 more hybrid-electric Prius sedans, bringing total in fleet to 25
- 2002: Joined DOE's Rebuild America program, aiming for more outreach activities
- 2002: Joined EPA's Green Power Partnership, pledging to acquire 3% of our electricity from clean, renewable sources

# “ENERGY MANAGEMENT 101”

- Collect building energy use data, establish baseline of consumption for each facility
- Review existing energy-related practices, policies, technologies
- Walk-through audits and immediate changes to O&M where feasible
- More detailed survey of high-cost, high-energy facilities



# “ENERGY MANAGEMENT 101”

You may have a problematic building if...

- its electricity consumption is pretty constant, month-to-month, season-to-season...
- its natural gas use for heating was the same over a very mild winter as it was over a very cold winter...

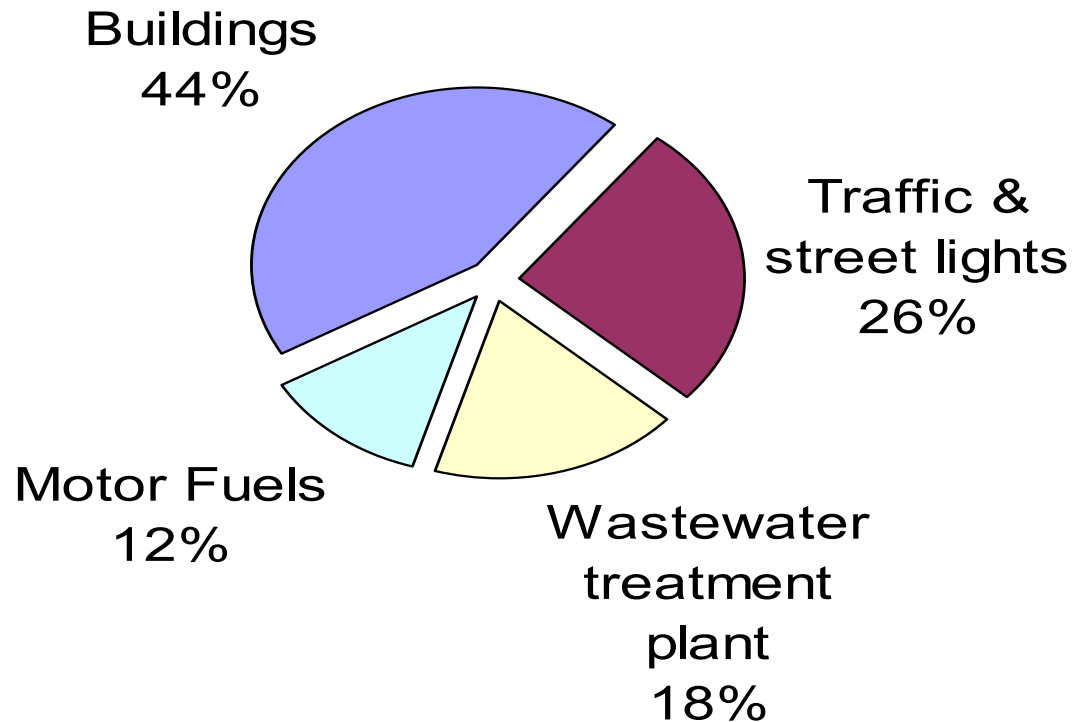
# “ENERGY MANAGEMENT 101”

- Utility bill analysis can reveal rate savings
- Bottom-up approach to buildings retrofits:
  - **operation and maintenance**
  - **insulation (!)**
  - **lighting**
  - **motors, appliances**
  - **central heating & cooling systems**

# “ENERGY MANAGEMENT 101”

- Preparation of overall strategic plan
- Make investment in energy-efficient technology the norm (developing environmentally-preferable purchasing policy)
- Keep eyes open for policy opportunities
- Useful synergies with other stakeholders, especially with co-benefits of efficiency
- Share lessons learned

## **Arlington County Government's \$7 million energy bill, by function, FY01**



# Where we are headed?

## Reasonable targets for 2010?

- 20-25% increase in efficiency in buildings, partially offset by growth in facilities, services
- 80% reduction in energy use by traffic signals, partially offset by increasing number of streetlights
- 10-30% increase in fleet fuel economy, with potential changes in VMT and fleet size
- Water treatment plant efficiency gains vs. increasingly-stringent effluent standards

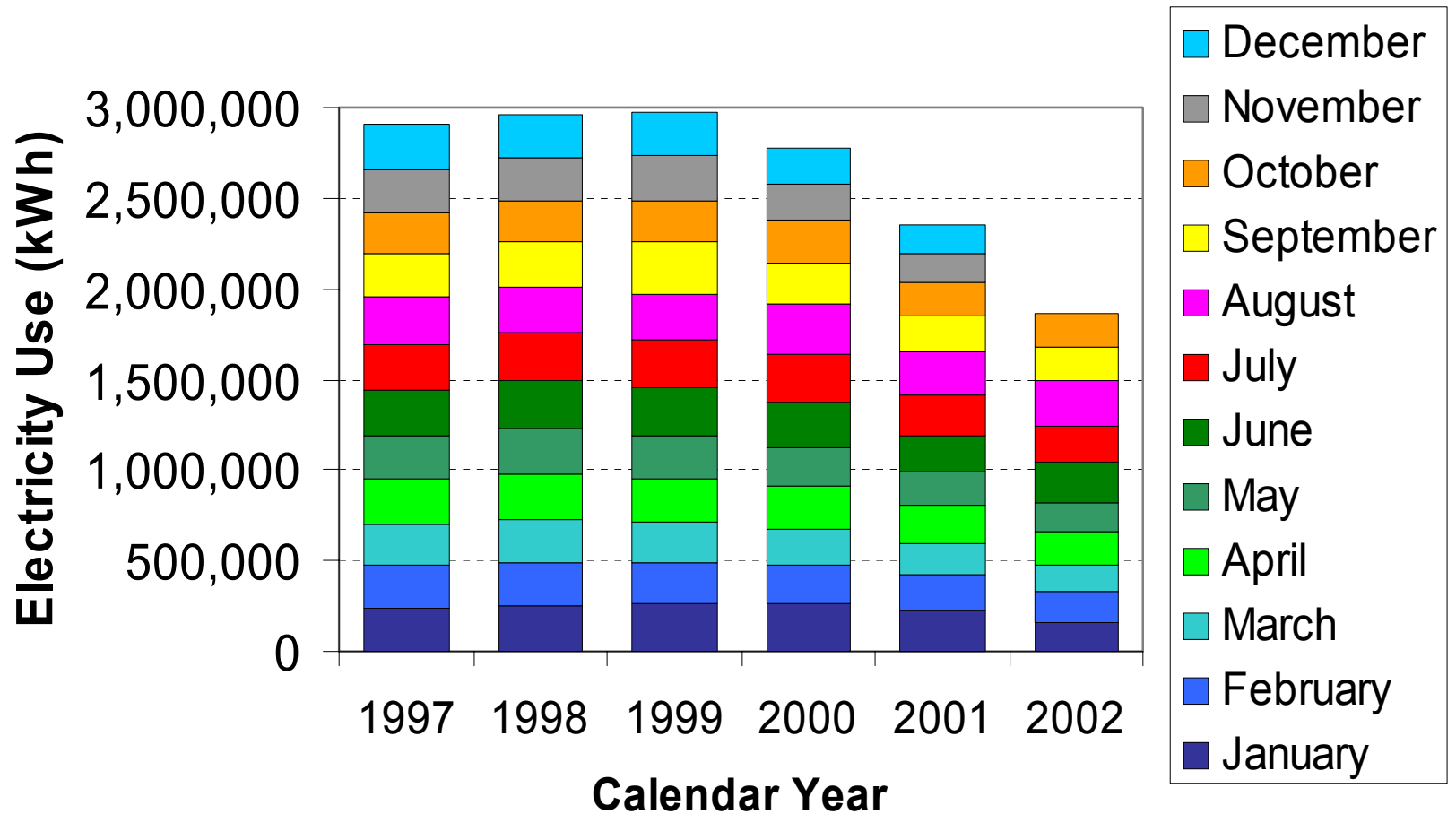
# ELECTRICITY

- Electricity is ~57% of the county government's energy use, on a Btu basis
- Electricity is responsible for ~80% of our CO2 burden
- Electric service ~83% of our energy costs

## RESULTS: Central Library, 161,000 sf (includes a 70,000 sf garage)

- Renovated and doubled in size in 1992, electric bill ~\$135,000/yr
- Basic O&M improvements key
  - troubleshooting HVAC distribution system
  - improved scheduling of equipment
  - incandescent to compact fluorescent lamp retrofits
- 27% drop in electricity, \$20,000/yr savings
- Add'l lighting retrofits to yield more savings

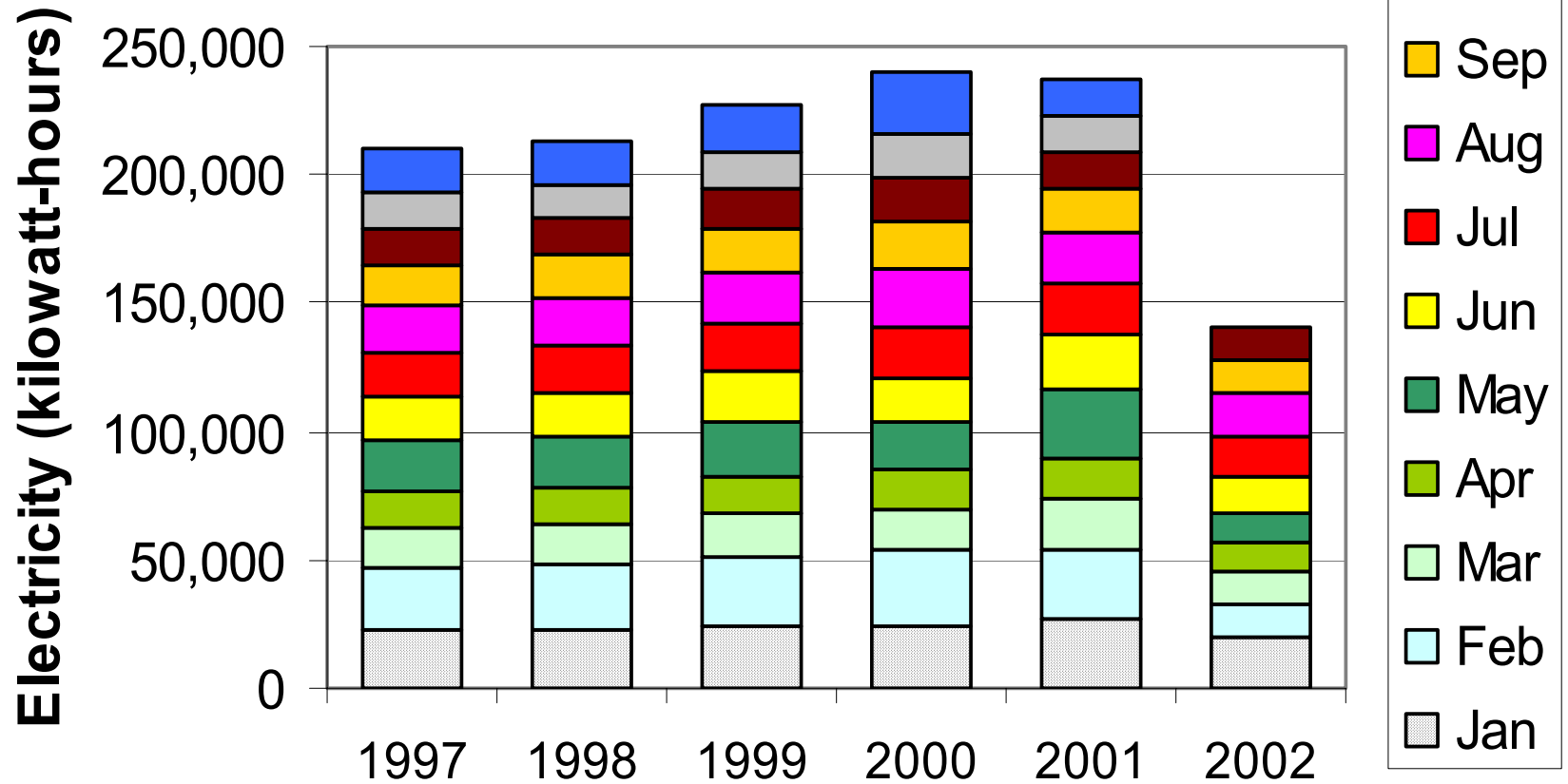
# Monthly Electricity Consumption in the Arlington Central Library. Energy Management Program Began in 2000.



## RESULTS: All-electric Argus House, 7,200 sf (residential facility for teens)

- Built in 1992, electric bill over \$15,000/yr
- Basic O&M improvements key
  - began preventive maintenance on kitchen equip.
  - investigated complaints of poor hot water, solved
  - one of three heat pump compressors replaced
  - incandescent to compact fluorescent lamp retrofits
- 30% drop in electricity use, \$4,500/yr savings
- Add'l lighting retrofits to yield more savings

# Argus House Electricity Consumption, 1997-2002

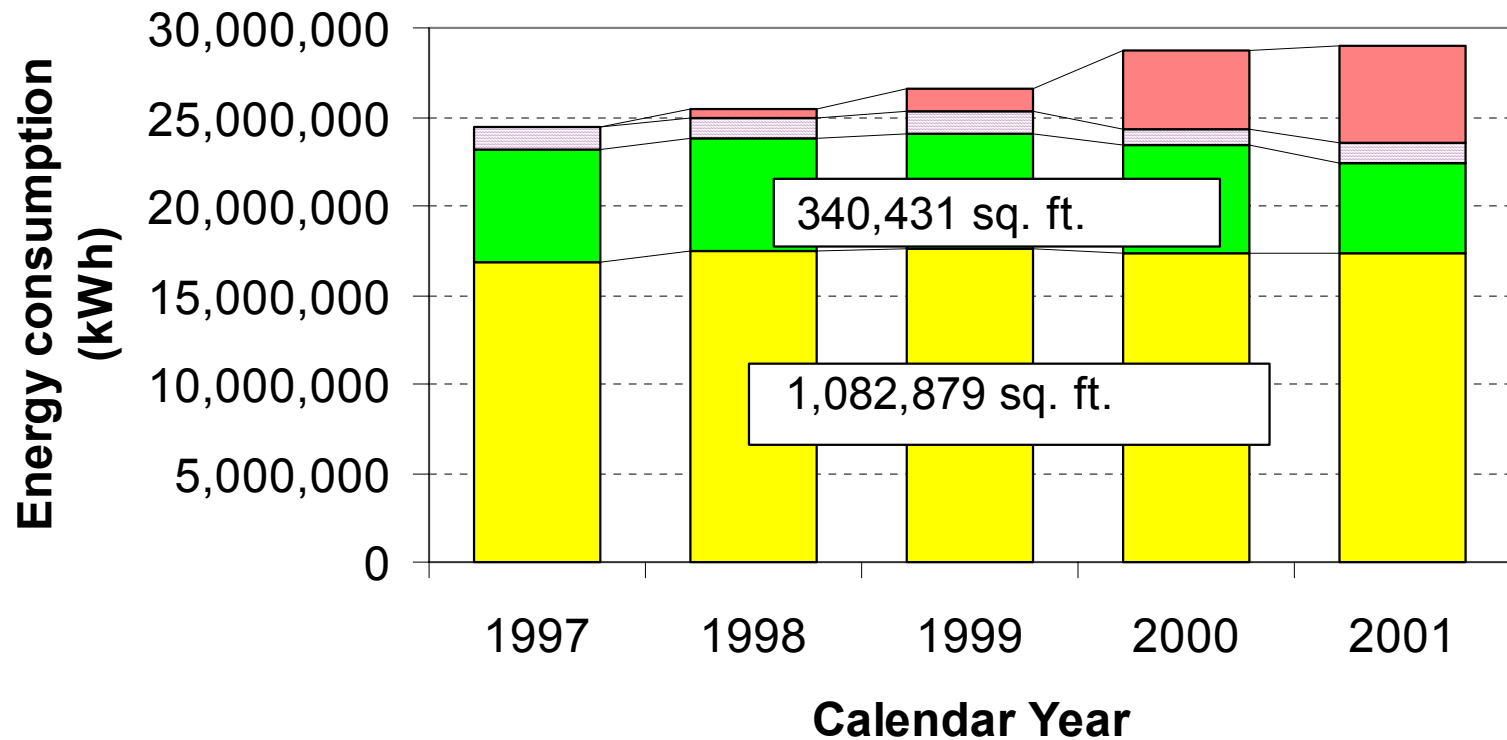


One catch: growth.

To meet greenhouse gas emission reduction targets, gains in existing buildings must more than offset additional energy uses in new construction.

*Not easy, but we can do this*

# Electricity Use in 51 Arlington County buildings, 1997-2001



■ 32 bldgs, no signif. energy mgmt (yet) ■ 9 bldgs, attention to energy mgmt.  
■ 5 bldgs in transition (69,850 sf) ■ 5 new properties (226,321 sf)

# Pulling it all together

- On-going efficiency improvements and alternate energy options available now, will cut our CO<sub>2</sub> emissions by ~4% in 2003 compared to 2000, despite growth in services.
- Efficiency improvements, combined with clean electricity and other alternative fuels, can reduce greenhouse gas emissions by our county government by 15-40% in 2010, compared to a 2000 baseline. The pace of adopting renewables is critical.

## Great things we haven't even touched yet

- Upgrading old, inefficient motors in buildings
- Replacing metal-frame, single-pane windows (difficult to justify on energy costs *alone*, must wait for building renovation)
- Upgrading central chillers and boilers

# CONCLUSIONS

- Very large energy and \$ savings can *still* be found in many buildings. Much of these savings can be gained immediately, at low cost, thereby demonstrating results that attract additional \$ for investment.
- Large (15-40%) reductions in greenhouse gas emissions are reasonable targets for local governments over a 10-year time horizon. Efficiency + renewables.